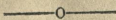


PHOTOGRAPHIC PORTRAITURE. 4



THE

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COLLODION
POSITIVE PROCESS

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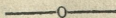
CHIEFLY TO BEGINNERS,

BY

GEORGE RUFF

ARTIST,

AND PRACTICAL PHOTOGRAPHER.

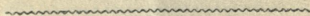


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1857.

PHOTOGRAPHING PORTRAITURE.

FOR THE USE OF THE STUDENT

COLLIDION

POSITIVELY PROOF

AND

CHIEFLY TO BEGINNERS.

BY

GEORGE RUMF

ARTIST

AND PRACTICAL PHOTOGRAPHER.

—

Published in the

QUEEN'S ROAD, LONDON.

THE NEW SYSTEM

OF PHOTOGRAPHY

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INTRODUCTION.

No process in the whole range of Photography has ever been of such world-wide popularity as that on Positive Collodion. First, in consequence of the small quantity of Apparatus and Chemicals required. Secondly, the simplicity of the Process itself, and the almost impossibility of failing to produce a picture of some kind. Notwithstanding this, very perfect Collodion Positives are somewhat rarely to be met with. A good picture on glass should rival the finest Daguerreotypes in whiteness, and beauty of detail, and surpass them in the absence of the disagreeable metallic reflecting surface, that even the best Photographs on silver-plate have to some extent, and which is disliked by all, but particularly by those who wear glasses, or are weak sighted. Having had considerable professional experience in the various Photographic Processes, and at present, and for some time past, in that herein described, and, in consequence of frequent applications to me to give lessons, for which I have no leisure, I have been induced to publish this small book exclusively on Positive Collodion Portraiture, and I can refer the reader for its practical results, to my Studio, where a large number of portraits, copies of engravings, &c. may be seen, all produced as described in this book.

45, QUEEN'S ROAD,
BRIGHTON, *April*, 1857.

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APPARATUS

AND CHEMICALS REQUIRED.

CAMERA and lens, stand, black focusing cloth, one or two gutta percha baths and glass dippers,, gutta percha tray for fixing, large tray for washing, pail for waste water, yellow calico curtain for dark room, two jugs for pouring water over the plate, a plentiful supply of clean water, three cloths for cleaning glasses, one cloth for wiping slides, one cloth for wiping the back of plate, two glass funnels, stoppered bottles for all the Solutions, Collodions, &c., wash leathers for polishing plates, glass measures, white and thick grey filtering paper, Solution of Nitrate of Silver, called the bath ; Iron Solution for developing, Cyanide Solution for fixing, Glacial Acetic Acid, Alcohol, Ether, Collodion, Distilled Water, Black Varnish for backing, Boxes for Glasses, Glass-plates of the required sizes, and in addition to these, Cyanide of Potassium, Ammonia, Nitric Acid, and Tripoli Powder are required, but must not be kept with the other chemicals, or in the working room, as they all contaminate more or less, Tripoli being dusty, Ammonia causing alkalinity of the bath, the fumes of Nitric Acid producing an acidity not desirable, spoiling the working of that important solution, the bath, causing the pictures to be metallic and otherwise imperfect.

SKETCH OF THE PROCESS.

A plate of glass is cleaned, polished, and coated with Iodized Collodion, immersed in a bath, of Nitrate of Silver, lifted from thence, and placed in a dark slide.

The focus taken, the plate exposed in the camera, then removed to dark room. The developing Solution poured over the invisible picture, when it gradually appears, is fixed, washed, dried, backed with Black Varnish, and placed in frame or case.

THE PROCESS AND ITS MANIPULATIONS IN DETAIL.—THE DARK ROOM.

A dark room is indispensable in every Photographic process. Darken the window, (except a slip a foot high at bottom,) with something black and perfectly light-proof. The slip to be covered with a yellow calico curtain, three or four times doubled, paste over all edges, cracks, or corners with slips of brown paper or yellow calico, in fact, make the room perfectly impervious to white light, or success will be impossible. Enough light may be admitted through the yellow curtain to work with, without danger of upsetting the chemicals, and no prejudicial effect will be produced on the sensitive surface of the prepared plate.

If a closet without a window, or large cupboard is used, a lanthorn with deep yellow or red glass kept at a distance from the plate, will be required. A room with a window if it can be had, is to be preferred. The first part of the process, up to, and including the coating of the plate, may be done in the usual daylight; but from the immersion of the plate in the bath, the remaining part of the process, (except taking the picture,) to the final washing, must be performed by yellow light only, the slightest ray of white light would spoil every picture.

OPERATING ROOM.

If the portrait is required to be taken in a room, place the sitter with his side to the window, and a screen of white calico on the darkest side, that farthest from the window, about two feet from the sitter, to

throw as much light as possible on the shaded side of the face and figure, thus preventing the shadows from being so dark and heavy as they otherwise would : a background of some material of even texture, of a middle tone, must be hung smoothly, or strained on a frame behind the figure ; when properly arranged a very effective portrait may be produced by this means.

WASHING THE CLOTHS & LEATHERS.

Make a boiling Solution of common washing soda, soak your cloths (good diaper is best,) in this for some hours, then rinse well in a great many clean waters, to free them from all trace of soda, soap, or other Photographic impurity, and dry them. Good new wash leathers should be chosen, thin, soft and large, soak them in a *cold* Solution of Soda, to free them from the dressing, then rinse as for the cloths, when dry to be rubbed soft, (with very clean hands, washed well in warm water, and rinsed to free from soap,) too much care cannot be taken in this part of the process, as it is the foundation stone of success, and no Photographer should be too proud to do the whole of it himself if he wishes to be thoroughly successful.

All the edges and corners of the glass plates are to be rubbed on emery cloth to prevent them cutting the hands, cloths, and leathers, and to keep the Collodion from washing up.

CLEANING THE GLASSES.

After grinding the edges, place them in a pan of clean water to soak, a few days before you clean them is best, take one from the pan and with a small piece of wash leather or rag washed as directed, rub the cleaning paste well all over both sides and edges, stand against a wall or shelf, so on for half a dozen, then take a clean cloth and rub off the Tripoli, then another clean cloth

must be spread over the hand, and the glass well polished in the cloth, without touching the plate with the hands, take it from the cloth by the edges and place it in a clean box for use, as many as required may be done, (half a dozen at a time, or they will get too dry to polish well). When the glasses have been used it will be found necessary to rub them over with dilute Nitric Acid or Cyanide Solution, to clean off the picture. They are then to be placed in a pan of clean water, and when all the glasses are in the pan pour off the water and replace with clean, then proceed as for new glass. This method of cleaning I think as good as any, but some prefer Solutions only, without Tripoli, for new glass. In the formula I have added these, and if required, they may be cleaned with them, the difference being, that they must be rubbed over before placing in water, the water poured off, and fresh added, the glasses are then to be taken from the water and dried in a cloth, then polished in another and put aside in boxes till required.

POLISHING AND COATING.

When you are about to take a picture, spread one end of your prepared leather over your left hand, on which, place your cleaned glass, take the other end of the leather in your right hand, and polish well on one side of the glass only, on breathing upon the plate the moisture should condense very evenly, like fine ground glass, if it appear stained or smeared, it must be again polished until the desired effect is produced, take it by one corner with the thumb and fore finger of the left hand, with care that the thumb projects very slightly on the corner, take the one ounce Collodion bottle in your right hand, and holding the plate horizontally, pour on the Collodion near the centre, rather more than will be required to cover it, let it run to each corner in succession, taking care to avoid that by which it is held, or it

will be stained, now pour off the Collodion into the bottle, first from the corner farthest from the thumb then lowering the plate, drain from that nearest the thumb, after a little practice this will be *easily* done, not a drop of Collodion need be wasted. Take the coated glass carefully by the edges with the thumb and fore finger of your right hand across the plate from edge to edge, and with your now disengaged left hand lift the dipper from the bath, place your plate, coated side outwards firmly on the dipper, and steadily, but without hesitation lower into the bath, any pause will cause an indelible line in the picture. The time to elapse between the coating and immersion of the plate varies with the temperature, from ten seconds to a minute or more. If your picture, when finished, has a dark shade on the side opposite to that drained, it has not been immersed sufficiently soon, but if the coating loosens and flakes off on the side drained, and appears stained at the edges, it has been immersed too soon. The remedy in each case is obvious.

TIME OF IMMERSION.

The time the plate is to remain in the bath is another difficulty with beginners ; after placing in the bath let it rest one minute in summer, two in winter, then lift it quickly out of the bath and replace it immediately, you will observe the film to have changed in character and colour, it now looks oily and slightly opalescent ; by lifting up and down a few times, then letting it rest about the same time as before lifting, on removing it again, the Solution will be found to flow evenly and smoothly over the surface, then, and then only, it is ready for the camera. It is a fallacy to say it can remain in the bath for some time after this without injury. *It cannot be used too soon after the oiliness has entirely disappeared.* If it is left in the bath a few seconds after this, the resulting picture is certain to be of a bad colour, and wanting in clearness.

I have never found an instance to the contrary, in fact, to get a perfect picture, the greatest accuracy in every particular is indispensably necessary. Clean the frame with the frame cloth, lift the dipper from the bath with the left hand, remove the plate with the thumb and fore finger of the right hand, draw the back of the glass over your cloth kept for the purpose, and carefully clean the edges, place in the frame Collodion downwards, a piece of thick filtering paper to be laid at the lower edge of the holder, close your frame and proceed to your operating room.

FOCUSING.

Place the camera on the stand facing your sitter, remove the cap, turn out the lens half-way, now draw out the body of the camera till the figure is distinctly seen on the ground glass, tighten the back screw, (this may be done beforehand,)—what I am about to describe must be done at the time of taking the picture;—study the utmost rapidity of focusing and arrangement consistent with its being carefully and *accurately done*, I have seen a recommendation to focus and arrange the sitter before taking the plate from the bath, a method that can never be successful in professional practice, for by this plan the sitter is kept one or two *minutes* in position longer than is necessary, consequently, a bad expression will invariably be the result, from the sitter feeling fatigued; the shorter the time you keep your sitter immovable the more successful the picture is likely to prove, (as far as natural expression is concerned) My plan of proceeding is this; bring out your slide containing the prepared plate, determine quickly the *best* view of the head and figure, see that the hands and drapery are well arranged, place your black cloth over your head and the body of the camera, turn the pinion of the lens backward and forward until the eye of your sitter

appears very bright and clear on the ground glass, now replace the cap, draw out your ground glass and substitute the dark slide, draw up the shutter. The sitter must now be required to remain as immovable as possible, remove the cap for the required time, replace it, and immediately release your sitter, close the shutter, remove the slide to dark room for developing. Now, all this, that has taken some minutes to describe, can be accomplished by the practical Photographer in nearly the same number of seconds. The shorter your operation the more pleasing to your subject, for there are few who like sitting for portraits any great length of time, for this reason I have always endeavoured to be as rapid as possible in this part of the process, deciding quickly if any change of position is required, this can only be accomplished after extensive practice and some amount of artistic knowledge, which must be acquired if success is desired in Photographic portraiture.

TIME OF EXPOSURE.

The time of exposure in camera is so variable, that but slender guidance can be given, in my own operating room the variation is often as great in one changeable day as throughout the year, with this exception, in the summer the exposure is often as low as four or five seconds, in winter seldom less than fifteen or twenty. In the summer, when we have a cloudy day, it will alter from five seconds exposure to fifty or sixty, in a very short time, I took to-day several pictures in rapid succession, (November 12, 1856,) to the first I gave 55 seconds, timed to a second, the next picture 45 seconds, for I had noticed a slight increase of light; the third picture, taken ten minutes after the *first*, 30 seconds; the fourth, the light growing more intense, 23 seconds, being a difference in fifteen minutes of 32 seconds; now, every one of these pictures were timed with the greatest accuracy; after the fourth the light grew weaker again, so I gave the fifth 33

seconds, and gave an increased time afterwards. Now probably the student will be curious to know how I could guess the time in this variable light so exactly, as not to over or under-expose one of the pictures taken; constant practice has rendered me proficient in this, as in other details of my favourite employment. I have taken Photographic pictures six days in the week, for several years, and have learned to measure the quantity of light with the eye so nearly, as *seldom* to make a mistake. I have dwelt at length on this in consequence of its importance. On removing the slide from the camera, replace the ground glass to prevent dust, (never omit this,) and proceed to the dark room, close the door, then remove your plate carefully from the holder by the edges with the right thumb and finger, turn over and change to left holding by the uncovered corner, with coated side upward, nearly the same as for coating, but slightly inclining toward your developing measure, which is held in the right hand, pour your developer across the lower edge, quickly but without violence, in this direction, ———, and as you do this, allow your plate to gain a level, so as to cover the glass instantly, and intently watch the development; on removal from the camera no trace of the picture is visible, but very soon after the application of the developer the picture gradually appears, the plate should be held above the yellow light admitted to your dark room, near the window. If the portrait has been exposed the exact time, the linen will be the first to appear, followed by the high lights of the face, hands, &c., and lastly, the more shady parts of the dark draperies, the development must not be carried too far, or your picture will appear grey and without force. The developer (No. 5,) I have given in page 17 is a slow one, which will not only be found the best for beginners from the ease in manipulation, but will give the most perfect

pictures in the hands of the more experienced. The over-exposed picture (the most frequent fault with the inexperienced operator,) will appear very quickly and nearly all at the same time, instead of in the regular order of the well-timed picture, and when finished, will have a flat deadly look, anything but pleasing as a picture or portrait. In contrast, the under-exposed Photograph will appear very slowly, the linen appearing and gaining in intensity some seconds before the appearance of the face and hands, while the details of the shadows are altogether wanting; the sombre look of a portrait, that has not received its proper amount of light, is far from pleasing, for they make the sitter look years older, darker, and otherwise unfavourable. The perfect picture is neither under nor over-exposed, developed with the greatest nicety, free from stains, spots, or blemishes of any kind, with pearly lights, clear shadows, easy in position, the expression unaffected and natural. Qualities not very easy of attainment, but when reached, they compensate for the anxiety and trouble of production.

We will now suppose the picture properly timed and accurately developed. Pour off the Solution, and wash well by pouring water from a jug over the plate until the greasiness has disappeared, when it must be placed in the fixing Solution, which will clean the picture in a few seconds, and it is seen for the first time in all its perfection, or may be imperfection, according to your amount of success, it must be again well washed with common water, about a quart will be required, then finish with one ounce of distilled water, stand face to the wall and resting on thick blotting paper to dry, or dry at once by the fire, or spirit lamp, pour black varnish on the uncoated side of the glass, (unless required non-inverted, when it must be poured on the picture, but much of the brightness is thus lost, the picture is

never so good this way,)—mount in frames or cases by gumming paper over the edges of a mat glass and picture for cases, and over the whole back of Passe par-tout frames. It is indispensible this should be done the day they are produced, or they will be injured by the damp of the atmosphere, when secured in this way they must be among the most durable of pictures, if proper care in finishing and washing has been exercised.

I have collected here, formula for all the Solutions required, or mentioned in the book, thinking it preferable to encumbering the description of each manipulation with the method of preparing the required Solution.

No. 1.

For cleaning the new glass plates.

Alcohol...	1 ounce.
Ammonia	1 ounce.
Common Water	...	2 ounces.	

Made of a creamy consistence with best Tripoli.

For cleaning glasses after use.

No. 2.

Nitric Acid	...	1 drm.	
Common Water	2 ozs.	or	

No. 3.

Cyanide of Potas-			
sium	1 drm.
Common Water	10 ozs.		

No. 3 may be used for new glasses if preferred, but the glass must be well rinsed afterwards.

No. 4.

SILVER SOLUTION, OR BATH.

Pure Nitrate of
Silver 1 oz.
Distilled Water 2 ozs.
Dissolve.

Iodide of Potassium 2gr.
Distilled Water $\frac{1}{2}$ oz.
Dissolve.

MIX.

Shake well together until the Iodide is dissolved, then add 12 ounces of Distilled Water, let stand an hour or two. Then filter through white filtering paper. It may be used immediately, but improves with age if a small quantity of fresh Solution is added occasionally.

No. 5.

Protonitrate Solution for developing.

Nitrate of Potash $\frac{1}{2}$ oz.
Distilled Water 10 ozs.
Dissolve.

Protosulphate of
Iron $\frac{3}{4}$ oz.
Distilled Water 10 ozs.
Dissolve.

MIX,

Then add

Glacial Acetic Acid ... $\frac{3}{4}$ oz.
Alcohol... .. $\frac{3}{4}$ oz.

Stand aside for use, pour off as required, when near the bottom of the bottle, filter.—Keeps well.

No. 6.

Protosulphate for developing.

Protosulphate of Iron 1 drachm.
Glacial Acetic Acid 1 drachm.
Alcohol $\frac{1}{2}$ drachm.
Distilled Water 3 ounces.

No. 7.

Pyrogallic Developer.

Pyrogallic Acid	2 grains.
Nitric Acid	1 drop.
Distilled Water	1 ounce.

No. 8.

Fixing Solution.

Cyanide of Potassium	$\frac{1}{2}$ ounce.
Distilled Water	40 ounces.

Great care must be taken with all the Solutions, but particularly this, as it is a strong poison.

COLLODION.

I give no method of making Collodion, indeed it would be absurd for me to do so, never having found it necessary to make any myself. The operator need not waste his time on the manufacture of this chemical, when it can be purchased of excellent quality from the Photographic Chemist. It seems to me to be as ridiculous as it would be for an artist to manufacture his own colours, canvass and brushes, when about to paint a picture. He has quite enough to do to compound tints and realize ideas. So with the Collodionist, he will find he has plenty to do, to measure with his eye the quantity and quality of the light, &c. But if any operator wishes to manufacture his own Collodion, ample instructions will be found in the various works on Photography, particularly *Hardwick's Photographic Chemistry*.

When you purchase Collodion, be careful to procure that made specially for Positives, as many errors are thereby avoided, for good Positives can never be produced

by Negative Collodion. Positive Collodion contains a smaller quantity of Iodide than that prepared for Negatives, and gives a more transparent film. If bought in small quantities, it may be iodized at the same time as purchased, but if a large quantity is required, it should be had separate from the Iodizing Solution, and iodized a few days or a week before use, and allowed to settle down clear, or the pictures will be spotty.

The manner of preparing the required solutions are given, they are very easily made up. The student can either prepare them himself (in which case scales and weights will be required), or allow a chemist to compound them for him. *I prefer making them up myself.*

SPOTTY COLLODION.

It must be evident to every one who has thought on the subject, that each plate coated and then drained into the bottle must carry some few particles of dust with it, that in spite of every care the Collodion must, after coating a number of plates, become more likely to produce spotty pictures. If after coating a dozen or more plates, the bottle is held up to the light, it will be found to contain a multitude of minute particles; these spoil the perfection of the finished picture, to obviate this, when you find your pictures are getting spotty from this cause, take another bottle of Collodion that has been allowed to settle as usual. You will generally find this a cure for spots. You will now wish to know what is to be done with the remaining spotty Collodion. Keep a stoppered bottle, 4oz. or larger if required, to pour the waste into each day, and when it has settled down decant into 1oz bottles for use, it will be found nearly as good as at first. Any sediment at the bottom of the waste bottle may be thrown away.

THE SILVER BATH.

On the good working qualities of this important solution depend nearly all the beautiful points of the finished picture. To work perfectly for Positives it should be very slightly acid to litmus paper. I have experimented largely on the Nitrate Bath, and I find I can never get many pictures in succession clear and bright in a neutral bath—the first may be clear, the second hardly so good, and the third almost always very foggy. There may be exceptional cases, but they are rare. As a general rule for easy and perfect working, the Bath should contain so much acid (Acetic) as will change the blue litmus paper to a purple red colour; if it change it immediately to a bright red, it contains too large a quantity, and will fog and work slowly. If the Bath is not found sufficiently acid, one drop of Glacial Acetic Acid to the 15 ounce bath should be used, the test applied, and a picture taken, and if not found sufficient, another drop may be added. If it is found to contain already too much acid, make a solution of 3 grains of common soda in half a drachm of distilled water, drop a few drops into the bath and agitate well, test for alkalinity, and when alkaline, Acetic Acid may be used drop by drop till the slightly acid condition is obtained, when the whole bath must be very carefully filtered, and will then be found fit for immediate use. When the solution has been used some days, it will be found to contain a quantity of fragments of Collodion from the edges of the coated plates, these fragments will be likely to stick upon the surface of the Collodion when immersed, causing large blurs. When this is the case, filter the solution into the bath bottle, rinse the gutta percha bath well with distilled water and replace the solution. A clean dipper must also be used.

DIFFERENT DEVELOPERS.

For my own use, I prefer the Protonitrate Solution to develop the picture, for the following reasons : It gives a very white picture in the lights, not too black in the shadows of the face ; is very regular in its action not so apt to stain as those containing Nitric Acid ; works slowly, consequently is not so liable to over-develop, and is more manageable altogether than the more violent developers. The common Protosulphate Solution is very good when used of the proper strength ; is more rapid and powerful than Protonitrate ; will bring out the picture with less light ; gives very good pictures, but not always quite so white as those from Protonitrate ; a shorter exposure in the Camera is required. In opposition to this, the Pyro-gallic Developer with Nitric Acid, develops very slow and regular, very white, but is apt to give the light parts too intense, the blacks consequently heavy. It requires nearly double the time of exposure necessary with Protonitrate, therefore is inadmissable with a weak light or in rooms. If your developer with the properly exposed picture, does not work so clear as it should, 5 or 10 drops of Glacial Acetic Acid to each ounce will be found to be an improvement.

DRESS AND ITS EFFECTS.

In the dress of your sitter dark colours should predominate, too much linen or light drapery is a decided disadvantage, not so much for the colour itself, as for its effect, it tends from natural contrast to darken the hands and face, the flesh tones being so many shades removed from white or the light coloured materials used in ladies' summer dresses. On dark or black draperies the hands appear beautifully white, giving a much more pleasing effect. The sitter should look steadily

at the required object, but only as if reading a book, Winking should not be prevented, for if an effort is made to keep the eyes from winking as usual, a staring, fixed, unnatural expression is the consequence. The head-rest is extremely useful to keep down the vibration caused by the circulation, breathing, &c.

OBSERVATIONS ON APPARATUS.

It has not been thought necessary to give a description of each piece of apparatus, the author feeling assured that no person who wishes to practise Photography will do so without having gained some knowledge of the form and mode of using the Camera, Stand, Bath, &c. Indeed, I have always found those who sell the materials ever ready to explain the use of the implements they sell, and five minutes demonstration will give more knowledge of their form and mode of working, than a volume of explanation.

VARNISHING POSITIVES.

Varnishing Positive Pictures gives great depth to the blacks, but tends to lower the lighter parts, giving altogether a darker picture. Some pictures look very well varnished, but its effect is rather uncertain. Chloroform Varnish is the best. It is applied in the same way as Collodion, but will be found more difficult of application, wavy lines being the rule, a smooth surface the exception.

HALF-TONE.

We hear great talk of late of half-tones. I believe *many* that use the term have but a faint idea of its meaning. I will here give my definition of this expression, as I understand it. Half-tone in Photographic Portraiture has the same meaning as demi-tints and reflexes in painting. Those delicate reflected lights,

and half-shades on the darker side of the face of a portrait, the iris of the eye as distinguished from the pupil, the light reflected in the shadows of dark cloth, or satin, the shades of white linen, details of the hair, &c., these are properly the half-tones, and on their being *perfectly* rendered depends all the beauty of Photographic detail. We often hear of *plenty* of half-tone, *good* half-tone, half-tones *well* brought out, &c. but those who talk thus must remember that too much half-tone is undesirable, as it makes the worst of pictures, worse even than its deficiency, grey, flat, and without force and shadow, unworthy the name of Photographs. There should undoubtedly be all the half-tone in the picture that is found in nature, but in the same delicacy, unobtrusive beauty, truth and softness, so as not to interfere with that great charm, in Photography as well as painting, breadth and roundness, otherwise they are imperfect.

LENSES AND CAMERAS.

A steady stand, good Lens and properly adjusted Camera are indispensably requisite in every Photographic process, and in none more so, than with Collodion. The Camera back, called the dark slide, holding the plate should so correspond with the ground glass frame, that each (the plate and ground glass) should fall at *exactly* the same distance from the lens. A Camera faulty in this particular is worse than useless. A Lens also in which the visual and working foci do not meet at the same point, should be discarded as more trouble than value. My advice on Camera, Lens, and every article connected with Photography is to have the *best* of everything, feeling assured it will be found *n u h* cheaper than low-priced articles, erroneously called cheap. Low price is not always economy, especially in optical instruments.

DIFFICULTIES WITH HINTS FOR THEIR REMOVAL.

The novice sometimes will find it difficult to coat the plate, without wavy marks, smoothly, cleanly, and without touching the thumb or wasting the Collodion. In this, practice and care will bring success, and *remember not to hurry.*

Developing scarcely ever ceases to be a difficulty, even to the experienced. The blot or stain the Solution leaves when it is violently poured on the film is a formidable obstacle to overcome; with great care however, the student may render the spot of little consequence. Never pour the Solution from a measure larger than one ounce, and pour across the lower part of the picture, if poured on over the head, a blur is sure to be formed in spite of every care. Choose your developing measure with a small lip of this shape (V) it will be found much more effectual than the U shaped lip.

Always wash the hands between the fixing one picture and polishing the next glass, too much care and cleanliness cannot be exercised, stains are often caused by hands contaminated with cyanide, developer, &c. After washing the hands, rinse to free from soap, and wipe them dry.

When the Cyanide Solution does not clear the picture readily, throw half of it away, and make up to the proper quantity with fresh solution. The gutta percha dish to be washed occasionally, and filled with the fresh fixing solution.

Keep your bath covered when not in use, to prevent it getting dusty, for dust is a great enemy to the Photographer.

Keep the stoppers of your chemical bottles tight, for evaporation is rapid, and will alter the chemical preparations.

Keep plenty of clean water handy when you are at work.

Keep a clean cloth to wipe out your dark slide and holder, also one to clean the back of the plate when it is taken from the bath, and each for its separate use.

Blow off all dusty particles from the glass immediately before coating, to prevent spots.

Clean the lip and neck of your Collodion bottle before you pour on the Collodion, to prevent comets.

When your Collodion works thickly and will not coat evenly, thin with a small quantity of pure *Æther*, then shake well and let stand for use.

The Developing measure to be often washed clean.

The leathers used for polishing to be rinsed in clean water and dried, when they work stickily on the glass plate. The cloths with which you clean your glasses to be frequently washed in water alone and dried.

Keep the pans in which you soak your glasses, for that purpose only.

Never clean your glasses in or near the dark room.

Having conducted the student to the conclusion of the process, I must here leave him with my best wishes for his success, which if the directions are as carefully followed, as they are fairly given, is within *his* reach as well as *mine*.



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